IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application No. 09/540,524	)	
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Filed: March 31, 2000	)	Art Unit: 2862
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Confirmation No.: 1816	)	Examiner: T. Fetzner
	)	
Inventors: J. Tamez-Peña et al	)	Docket No.: 000687.00138
	)	
Title: MAGNETIC RESONANCE IMAGING WITH RESOLUTION AND CONTRAST ENHANCEMENT	))))	

RESPONSE TO OFFICE ACTION

Hon. Commissioner for Patents
Box Non-Fee Amendment
Washington, D.C. 20231

Sir:

The Office Action mailed March 28, 2002, has been carefully considered. In response thereto, the Applicants respectfully submit that the application in its present form is in condition for allowance. Accordingly, reconsideration and withdrawal of the outstanding Office Action are respectfully solicited in view of the following remarks.

The Office Action acknowledges that the informal drawings are acceptable for examination purposes and that claims 1, 2, 4-13, 28, 29 and 31-40 have been elected with traverse, although it does not comment on the reasons for traverse. Claims 1, 2, 4-10, 28, 29 and 31-37 are rejected under 35 U.S.C. §102(b) over PCT Publication No. WO 98/24063 to *Freundlich et al*, and claims 11-13 and 38-40 are rejected under 35 U.S.C. §103(a) over *Freundlich et al* in view of U.S. Patent No. 5,786,692 to *Maier et al*. For the reasons set forth below, the Applicants respectfully traverse the outstanding grounds of rejection.

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Freundlich et al teaches a method for reconstructing one or more non-axial image slices in a CT scanner. The image slices can be parallel, as shown in Fig. 2 with respect to the slices 50, 52, 54, or they can be non-parallel, as shown in Fig. 3, with regard to the slices 66.

However, the Applicants respectfully disagree with the interpretations of certain teachings of the reference set forth in the Office Action. For example, the Office Action identifies the elements 60, 62, 70, 72 and 74 in Fig. 2 as slices of which image data are taken. However, as explained in the first full paragraph of page 13 of the reference, the elements 70, 72 and 74 are axial planes which are used to define parallel back-projection lines 60, 62, 64 on each of the slices 50, 52, 54. Also, the teachings of the reference which are cited in the Office Action for fusing the first and second pluralities of slices actually teach fusion of parallel or commonly oriented slices or planes. While taking image data of multiple, non-parallel slices is taught with reference to Fig. 3, the reference does not provide an enabling reference for fusing two or more non-parallel slices. In fact, the paragraph spanning pages 11 and 12 teaches that several parallel slices could be selected and reconstructed in each disc space, suggesting that only the image data of parallel slices are fused.

Freundlich et al is concerned with reconstructing new, non-axial image views from CT data that have already been obtained along the conventional axial slices (or from conventional spiral axial slices). And these new, non-axial image views are obtained by entering data into a new backprojection operation along the new non-axial view of interest. The present claimed invention does not require backprojection operations as is the case in CT. Furthermore, the present claimed invention fuses data obtained along different axes, but in *Freundlich et al* there is no suggestion that the CT system should be redesigned to obtain data along different

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orthogonal axes. Their strategy is to simply reconstruct a new image plane (a new view) from existing CT data.

Thus, the Applicants respectfully submit that the claim limitations directed to scanning the subject in first and second directions and fusing the first and second pluralities of slices are not taught by the reference.

While the dependent claims are patentable for the reasons set forth above, the Applicants will consider some of the arguments with regard to the dependent claims for the sake of completeness.

With regard to claims 2 and 29, the Office Action repeats the assertion that the axial planes 70, 72 and 74 are slices. The Office Action further notes that *Freundlich et al* teaches that oblique slices are taken along planes "generally not perpendicular to axis 34," which the Office Action reads as suggesting that slices perpendicular to that axis are possible. However, no teaching is identified to take those slices as well as slices parallel to the axis 34.

With regard to claims 5 and 32, the Office Action considers the angle ϕ to represent the gradient, although no explanation is given as to why.

With regard to claims 6 and 33, the Office Action alleges that the slices in the references are "acquired in a 'hill climbing' manner." Even if the lines 60, 62, 64 were slices, they still would not teach or suggest that the *correlation* is maximized through a hill-climbing technique.

Therefore, the Applicants respectfully submit that *Freundlich et al* does not teach or suggest the present claimed invention.

Maier et al is even more unrelated. *Maier et al* is concerned with a specialized technique called diffusion imaging. In their invention, the excitation of regions is accomplished by slice excitation RF signals arranged so that the spatial region of excitation is defined by intersecting

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planes. By sequentially exciting and then reading out a plurality of intersecting planes, eventually an entire volume of diffusion data can be obtained. The present claimed invention does not rely on excitation and readout of intersecting planes; instead, whole tomographic slices (images) are obtained in the conventional manner, but along different axes, and these tomographic image data are then fused. The present claimed invention does not rely on diffusion imaging parameters, as well. Since *Maier et al* does not overcome the above-noted deficiencies of *Freundlich et al,* the Applicants further traverse the rejection under §103(a).

If any issues remain that can be overcome most easily through a telephone communication, the Examiner is invited to telephone the undersigned at the telephone number set forth below.

Please charge any shortage or credit any overpayment of fees to BLANK ROME COMISKY & MCCAULEY LLP, Deposit Account No. 23-2185 (000687.00138). In the event that a petition for an extension of time is required to be submitted herewith and in the event that a separate petition does not accompany this Response or is insufficient to render this Response timely, the Applicants hereby petition under 37 C.F.R. §1.136(a) for an extension of time for as many months as are required to render this submission timely. Any fee due is authorized above.

Respectfully submitted,

José TAMEZ-PEÑA et al

By: David J. Edmondson
Reg. No. 35,126

Blank Rome Comisky & McCauley LLP
The Farragut Building, Suite 1000
900 – 17th St., N.W.
Washington, D.C. 20006
202-530-7400 (receptionist)
202-530-7438 (direct dial to attorney signing paper)
202-463-6915 (facsimile)

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